

IN THE SPECIFICATION:

Please amend the paragraph starting at page 1, line 20, and ending at line 24, as follows.

--Also, U.S. Patent No. 4,760,436, discloses ~~regarding~~ that two beams are received by independent arcuate light receiving sensors, and these sensors are used properly in conformity with the rotation angle to thereby detect a round of continuous angle.--

Please amend the paragraph starting at page 8, line 22, and ending at page 9, line 11, as follows.

--The above-described position errors are not angles and therefore, more or less conversion thereof must be done when eccentricity correction calculation is actually done. Assuming that the numbers of divisions of the light receiving sensor 1 and the light receiving sensor 2 are the same, the diameters thereof differ from each other and, therefore, changes in the position errors on the respective circumference, when converted into angles, assume different values. When the diameters of the light receiving sensors 1 and 2 are defined as R1 and R2, respectively, the ratio between angle errors corresponding to the position errors becomes about $D/R1 : D/R2$, and it will be seen that the smaller are the diameters of the light receiving sensors 1 and 2, the greater ~~become~~ the angle errors. Accordingly, if simple addition is done as described above, the angle errors cannot be negated.--

Please amend the paragraph starting at page 10, line 15, and ending at page 11, line 9, as follows.

--Also, while in the present embodiment, the light receiving sensors 1 and 2 are formed into a circular ring shape, a similar effect can be expected even if use is made of a part of a circular ring or the beams from the light emitting elements 4 and 5 are made

obliquely incident and the light receiving sensors 1 and 2 are formed into an elliptical shape. Also, while here, angle information corresponding to the incidence positions of two beams detected by the light receiving sensors 1 and 2 is obtained, and this is corrected by the use of the diameters of the light receiving sensors 1 and 2 and thereafter is added to thereby obtain the beam rotation angle; Also, the incidence positions of the beams detected by the light receiving sensors 1 and 2 may be represented by polar coordinates by the use of the diameters of the light receiving sensors 1 and 2 and the angle information corresponding to the incidence positions of the beams, and the beam incidence positions represented by the two polar coordinates may be linked together by a straight line, and the The angle formed between this straight line and reference line PL may be obtained by calculation.--

Please amend the paragraph starting at page 13, line 25, and ending at page 14, line 7, as follows.

--Also, while in this second embodiment, lights of different powers are condensed on the light receiving sensor 1 by the use of the lenses 8 and 9, a similar effect can be obtained even if light emitting means of different powers are used instead of the lenses 8 and 9. Also, ~~some~~ a light receiving sensor 1 ~~has~~ may have different sensitivity depending on the wavelength of light, and if such sensor is used, two beam positions can be detected by changing the wavelengths of two light sources.--

Please amend the paragraph starting at page 16, line 9, and ending at line 16, as follows.

--In Fig. 9, reference numeral 17 designates a motor, and reference numeral 18 denotes the shaft of the motor 17, and a reflecting portion (reflecting member) 16 which is light deflecting means is formed on one end surface of the shaft 18. The reflecting portion

16 has a sawtooth-like cross-sectional shape and has a plurality of fine inclined surface surfaces parallel to one another.--

Please amend the paragraphs starting at page 27, line 2, and ending at page 28, line 7, as follows.

--The CPU 35 deduces the beam incidence position (i.e., angle information corresponding thereto) from the output PS of the register 34. The method of deducing the beam incidence position (angle information) will hereinafter be described in a little greater detail. The following is the description when the number of beams incident on the light receiving sensor 1 is two and design is made such that the two beams are incident on the substantially opposed positions on the circumference. Figs. 25 and 26 are flow charts illustrating the calculating operation. Fig. 27 shows the signal of each portion of the block diagram of Fig. 19. The signals of Fig. 27 will first be described. SP is the output of the filter means 32, and more particularly is a signal having had its noise of a high frequency component removed by the filter means 32 relative to a signal in which the outputs of the respective light receiving elements of the light receiving sensor 1 have been clockwisely outputted in order.

The incident beams are two and are incident on the substantially opposed positions on the circumference of the light receiving sensor 1 and therefore, as shown in Fig. 27, two mountain-shaped waveforms appear at ~~timing~~ timings corresponding to the beam incidence positions. CP is the result of the signal SP having been compared with a predetermined comparative value by the comparison means 33. Thereby, there is produced a pulse signal having pulse edges a, b, c and d. PS represents the result of the detection by the register 34 as to at which position that light receiving element of the light receiving sensor 1 which is scanning lies at the timing of the pulse edge of the signal CPU.--

Please amend the paragraph starting at page 31, line 19, and ending at page 32, line 5, as follows.

--The correction calculation is to further add 1024 to the added value and then divide the result by 2, and obtain the remainder after the result is divided by 1024. Consider, for example, the addition of 10 and 1020. ~~When~~ when they are added up, the result is 1030, and when this is simply divided by 2, the result is 515, and it is not between 1020 and 10. So, when 1024 is added and then the result is divided by 2, the result is 1027. The remainder after this is divided by 1024 is 3, and thus the beam incidence position to be obtained is 3. Likewise, in the case of 525 and 546, if these are simply added up and the result is divided by 2, the result is 535.5 and a value between 525 and 546 can be obtained.--

Please amend the paragraph starting at page 33, line 27, and ending at page 35, line 3, as follows.

--Lastly, the beam rotation angle P is calculated from the variable PC and angle information P0 obtained in this manner. Here, the angle information P0 is re-read from the binary number with a sign into a binary number without a sign and the variable PC is made 1024 times as great and then is added to the angle information P0. Figs. 28 and 29 are flow charts showing the calculating method when the number of beams is three. Basically, this method is the same as the above-described content, but differs from the latter in that the number of beams is increased by one and therefore the variable PN is increased by 2 and the beam incidence positions are increased by one and the angle information becomes P3, and the angle information P0 has become one in which the angle information P1, the angle information P2 and the angle information P3 have been added up. Also, while in the present embodiment, the value of the counter 30 is reset by the CPU 35, design may be

made such that after a beam position is detected, the next beam position is foreseen and the count value of the counter 30 is reset so that the scanning position may be skipped to a position near the foreseen next beam position. Also, while in the present embodiment, the light receiving elements of the light receiving sensor 1 are clockwisely selected in order, design may be made such that the light receiving elements are alternately selected as in the interlace scan system of TV wherein every other light receiving element is selected and after one round, every other portion which has not been selected is selected in order.--

Please amend the paragraph starting at page 37, line 2, and ending at line 15, as follows.

--Fig. 20 is a block diagram showing an eighth embodiment. In Fig. 20, the same elements as the elements shown in Fig. 19 are designated by the same reference numerals. While in the previous embodiment 7, one of the outputs of the light receiving elements of the light receiving sensor 1 is detected at a time, the present embodiment improves the ~~simultaneity~~ simultaneousness of the outputs of the light receiving elements and is adapted to read the output voltage value of the light receiving sensor 1 into the CPU 35 and calculate it. The present embodiment typically shows an example in which the outputs of two light receiving elements are detected at a time, and the outputs of more light receiving elements may be detected at a time.--

Please amend the paragraphs starting at page 39, line 21, and ending at page 41, line 8, as follows.

--Also, while design is made here such that the substantially opposed positions on the light receiving sensor 1 are detected at a time, design can be made such that if the number of beams is three, three locations are detected at every other 120° at a time. Also, as specific methods of obtaining the beam incidence position, there ~~are~~ is a method of

obtaining a range in which the quantity of received light is greater than a predetermined threshold value as described above, and regarding the center thereof as the beam position, a method of averaging beam positions obtained with such several threshold values provided, a method of regarding the peaks of the mountain-shaped waveform as the beam position, a method of obtaining the center of gravity of the mountain-shaped waveform, etc.

Also, in some cases, the diameters of the beams are larger than a light receiving element and therefore, the beam positions cannot be deduced from a simply A/D-converted content. So, the quantities of received light by two adjacent light receiving sensors which are the results of A/D conversion inputted in succession may be successively compared with each other, and the point at which the magnitude relation therebetween is reversed may be regarded as the beam incidence position, or the quantity of light between the light receiving elements may be determined from the quantities of light before and after it by an interpolation technique such as linear interpolation, ~~whereby~~. Consequently, the center of gravity of the quantity of light or the peak position of the quantity of light may be obtained precisely.

Fig. 21 is a block diagram showing a ninth embodiment. In Fig. 21, the same elements as the elements shown in Fig. 19 are given the same reference characters. In Fig. 21, reference numeral 41 designates a conventional CCD having light receiving elements provided in a ring shape. The CCD 41 is designed such that the outputs of the ring-shaped light receiving elements are ~~clockwise~~ put out in a clockwise order in synchronism with the output signal of the oscillator 29, and has the function of output means.--

Please amend the paragraph starting at page 41, line 20, and ending at page 42, line 7, as follows.

--The CCD 41 changes over the light receiving elements in order along the ring and outputs signals corresponding to the quantities of received light of the light receiving elements in synchronism with a pulse signal from the oscillator 29. The CCD 41 is of such structure that it charges a capacitor with charges outputted from the respective light receiving elements at a time and takes out them in order at each predetermined timing and therefore, all the outputted signals are data at the same time. The CCD 41 resets the counter 30 at the start of data outputting, and starts to successively output signals corresponding to the quantities of received light of the respective light receiving elements in synchronism with the pulse signal from the oscillator 29.--

Please amend the paragraph starting at page 43, line 5, and ending at line 20, as follows.

--If one beam can be specified, the other beam positions can be specified because they are substantially predetermined positions, and an absolute beam rotation angle can be detected from this position information. Thereby, even when provision is made of a power saving circuit for cutting off a power source during stoppage, it is not necessary to memorize the beam rotation angle before the power source is ~~not~~ cut off and therefore, a reduction in cost and the saving of the space for the circuit can be achieved. Conversely, in the case of a construction in which the beams cannot be specified, if the beam rotation angle immediately before the power source is cut off is stored in non-volatile memory means such as a flash memory or SRAM backed up by a battery, an absolute beam rotation angle can be outputted in a pseudo fashion.--